

**WHAT IS CLAIMED IS:**

1. A test medium for proving a turbine meter, said test medium comprising a gas having the following characteristics:
  - (a) Density > approximately 2xDensity of Natural Gas;
  - (b) Dynamic Viscosity approximately < Dynamic Viscosity of Natural Gas; and
  - (c) Ideal gas behavior for approximately  $15^{\circ}\text{C} < T < 25^{\circ}\text{C}$  and approximately  $1 \text{ bar} < P < 50 \text{ bar}$ .
2. A test medium for proving a turbine meter according to claim 1, wherein said gas further has the following characteristic:
  - (d) Liquefies easily at a temperature > approximately  $-100^{\circ}\text{C}$  at atmospheric pressure.
3. A test medium for proving a turbine meter according to claim 1, wherein said gas further has the following characteristic:
  - (e) Stores at room temperature in liquid form at approximately  $P < 65 \text{ bar}$ .
4. A test medium for proving a turbine meter according to claim 1, wherein said gas is carbon dioxide.
5. A test medium for proving a turbine meter according to claim 1, wherein said gas is selected from a group consisting of carbon dioxide, argon and sulphur hexafluoride.
6. A method for proving a turbine meter comprising:  
  
arranging a meter to be proved in a prover system; and  
  
circulating a test medium through the prover system such that it passes through a reference meter and said meter to be proved, wherein said test medium is a gas having the following characteristics:

- (a) Density > approximately 2xDensity of Natural Gas;
  - (b) Dynamic Viscosity approximately < Dynamic Viscosity of Natural Gas; and
  - (c) Ideal gas behavior for approximately  $15^{\circ}\text{C} < T < 25^{\circ}\text{C}$  and approximately 1 bar < P < 50 bar.
- 7. A method for proving a turbine meter according to claim 6, wherein said gas further has the following characteristic:
  - (d) Liquefies easily at a temperature > approximately  $-100^{\circ}\text{C}$  at atmospheric pressure.
- 8. A method for proving a turbine meter according to claim 6, wherein said gas further has the following characteristic:
  - (e) Stores at room temperature in liquid form at approximately P < 65 bar.
- 9. A method for proving a turbine meter according to claim 6, wherein said gas is circulated through said prover system at a pressure of approximately 8 bar and a temperature of approximately  $20^{\circ}\text{C}$ .
- 10. A method for proving a turbine meter according to claim 6, wherein said gas is carbon dioxide.
- 11. A method for proving a turbine meter according to claim 6, wherein said gas is selected from a group consisting of carbon dioxide, argon and sulphur hexafluoride.
- 12. A method for proving a turbine meter according to claim 6, further comprising:  
injecting liquefied test medium into said circulating test medium.
- 13. A system for proving a turbine meter comprising:  
a test bench for mounting a meter to be proved;  
a reference meter;

a test medium circulation system, arranged with said test bench and reference meter, for circulating a test medium through said reference meter and a mounted meter to be proved; and

a test medium for circulating through said test medium circulation system, said test medium comprising a gas having the following characteristics:

(a) Density > approximately 2xDensity of Natural Gas;

(b) Dynamic Viscosity approximately < Dynamic Viscosity of Natural Gas; and

(c) Ideal gas behavior for approximately  $15^{\circ}\text{C} < T < 25^{\circ}\text{C}$  and approximately 1 bar < P < 50 bar.

14. A system for proving a turbine meter according to claim 13, wherein said gas further has the following characteristic:

(d) Liquefies easily at a temperature > approximately  $-100^{\circ}\text{C}$  at atmospheric pressure.

15. A system for proving a turbine meter according to claim 13, wherein said gas further has the following characteristic:

(e) Stores at room temperature in liquid form at approximately P < 65 bar.

16. A system for proving a turbine meter according to claim 13, wherein said test medium circulation system comprises:

a fill valve for inputting said test medium into said test medium circulation system;

a compressor for pressurizing said test medium circulation system;

a variable speed motor for driving said compressor and adjusting a pressure of said test medium circulation system;

flow straighteners arranged in advance of each of said reference meter and said test bench;

a pressure control valve;

means for cooling said test medium; and

pipes for connecting all of the foregoing elements.

17. A system for proving a turbine meter according to claim 13, wherein said gas is carbon dioxide.
18. A system for proving a turbine meter according to claim 13, wherein said gas is selected from a group consisting of carbon dioxide, argon and sulphur hexafluoride.
19. A system for proving a turbine meter according to claim 16, wherein said means for cooling said test medium comprises:  
  
one or more injection nozzles for injecting liquefied test medium into said test medium circulation system.
20. A system for proving a turbine meter according to claim 16, wherein said means for cooling said test medium comprises a heat exchanger.
21. A method for cooling a test medium circulating in a turbine meter prover system comprising:  
  
injecting liquefied test medium into said circulating test medium.
22. A method for cooling a test medium circulating in a turbine meter prover system according to claim 21, wherein said test medium has the following characteristic:  
  
Latent heat of vaporization > approximately 200 Btu/kg at  $15^{\circ}\text{C} < T < 25$  and  $1 \text{ bar} < P < 25 \text{ bar}$ .
23. A system for cooling a test medium circulating in a turbine meter prover system comprising:

one or more injection nozzles provided to said prover system for injecting liquefied test medium into said test medium prover system.

24. A system cooling a test medium circulating in a turbine meter prover system according to claim 23, wherein said test medium has the following characteristic:

Latent heat of vaporization > approximately 200 BTU/kg at  $15^{\circ}\text{C} < T < 25$  and  $1 \text{ bar} < P < 25 \text{ bar}$ .